NIOBIUM (COLUMBIUM)

(Data in metric tons of niobium content unless otherwise noted)

<u>Domestic Production and Use</u>: No significant U.S. niobium mine production has been reported since 1959. Domestic niobium resources are of low grade, some are mineralogically complex, and most are not commercially recoverable. Five companies produced ferroniobium and niobium compounds, metal, and other alloys from imported niobium minerals, oxides, and ferroniobium. Niobium was consumed mostly in the form of ferroniobium by the steel industry and as niobium alloys and metal by the aerospace industry. Major end-use distribution of reported niobium consumption was as follows: steels, 69%; superalloys, 31%. In 2007, the estimated value of niobium consumption was \$161 million.

Salient Statistics—United States:	<u>2003</u>	<u>2004</u>	<u> 2005</u>	<u> 2006</u>	2007 ^e
Production:	· · · · · · · · · · · · · · · · · · ·				
Mine					
Secondary	NA	NA	NA	NA	NA
Imports for consumption ^{e, 1}	5,590	6,910	7,610	10,500	10,500
Exports ^{e, 1}	170	276	337	561	600
Government stockpile releases ^{e, 2}	223	90	152	156	10
Consumption: ^e					
Apparent	5,640	6,730	7,430	10,100	10,000
Reported ³	3,670	4,220	4,600	5,050	5,000
Price, ferroniobium, dollars per pound ⁴	6.60	6.57	6.58	NA	NA
Net import reliance ⁵ as a percentage of					
apparent consumption	100	100	100	100	100

Recycling: Niobium was recycled when niobium-bearing steels and superalloys were recycled; scrap recovery specifically for niobium content was negligible. The amount of niobium recycled is not available, but it may be as much as 20% of apparent consumption.

<u>Import Sources (2003-06)</u>: Niobium contained in niobium and tantalum ore and concentrate; ferroniobium; and niobium metal and oxide: Brazil, 83%; Canada, 8%; Estonia, 2%; Germany, 2%; and other, 5%.

Tariff: Item	Number	Normal Trade Relations 12-31-07
Synthetic tantalum-niobium concentrates	2615.90.3000	Free.
Niobium ores and concentrates	2615.90.6030	Free.
Niobium oxide	2825.90.1500	3.7% ad val.
Ferroniobium:		
Less than 0.02% of P or S,		
or less than 0.4% of Si	7202.93.4000	5.0% ad val.
Other	7202.93.8000	5.0% ad val.
Niobium, unwrought:	_	
Waste and scrap	8112.92.0600 ⁶	Free.
Alloys, metal, powders	8112.92.4000	4.9% ad val.
Niobium, other	8112.99.9000 ⁶	4.0% ad val.

Depletion Allowance: 22% (Domestic), 14% (Foreign).

<u>Government Stockpile</u>: For fiscal year 2007, the Defense National Stockpile Center (DNSC), Defense Logistics Agency, disposed of 31 tons of niobium contained in niobium mineral concentrates. The DNSC's niobium mineral concentrate inventory was exhausted in 2007, its niobium carbide inventory was exhausted in 2002, and its ferroniobium inventory was exhausted in 2001. The DNSC announced maximum disposal limits for fiscal year 2008 of about 9 tons⁷ of niobium metal ingots.

Stockpile Status—9-30-07 ⁸					
Material Niobium:	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2007	Disposals FY 2007
Concentrates Metal	 10	_	 10	254 9	31 —

NIOBIUM (COLUMBIUM)

Events, Trends, and Issues: Niobium was imported principally in the form of ferroniobium (71%) and niobium unwrought metal, alloy, and powder (14%). Brazil was the leading supplier of niobium. By weight, Brazil supplied 91% of ferroniobium and 82% of niobium unwrought metal, alloy, and powder. Niobium apparent consumption is believed to have increased slightly in 2007 compared with that of 2006.

<u>World Mine Production, Reserves, and Reserve Base</u>: The Australian and Brazilian reserves and reserve base were revised based on information reported by their respective Governments. Canadian reserves and reserve base were revised based on information published by a mining company.

	Mine production		Reserves ⁹	Reserve base ⁹
	<u>2006</u>	2007 ^e		
United States			_	NA
Australia	200	200	21,000	320,000
Brazil	40,000	40,000	2,600,000	2,600,000
Canada	4,167	4,200	62,000	92,000
Ethiopia	11	10	NA	NA
Mozambique	29	30	NA	NA
Nigeria	35	40	NA	NA
Rwanda	80	80	NA	NA
Other countries	1 <u>8</u>	20	NA	NA
World total (rounded)	44,500	45,000	2,700,000	3,000,000

<u>World Resources</u>: World resources are more than adequate to supply projected needs. Most of the world's identified resources of niobium occur mainly as pyrochlore in carbonatite deposits and are outside the United States. The United States has approximately 150,000 tons of niobium resources in identified deposits, all of which were considered uneconomic at 2007 prices for niobium.

<u>Substitutes</u>: The following materials can be substituted for niobium, but a performance or cost penalty may ensue: molybdenum and vanadium as alloying elements in high-strength low-alloy steels; tantalum and titanium as alloying elements in stainless and high-strength steels; and ceramics, molybdenum, tantalum, and tungsten in high-temperature applications.

^eEstimated. NA Not available. — Zero.

¹Imports and exports include the estimated niobium content of niobium and tantalum ores and concentrates, niobium oxide, ferroniobium, niobium unwrought alloys, metal, and powder. Imports have been aggregated for consistency.

²Government stockpile releases are the uncommitted inventory change as reported by the Defense National Stockpile Center (DNSC). In Mineral Commodity Summaries 2007, Government stockpile releases were the sales reported by DNSC.

³Includes ferroniobium and nickel niobium.

⁴Price is time-weighted (by week) average of trade journal reported ferroniobium price per pound of contained niobium, standard (steelmaking) grade. Ferroniobium price was discontinued in 2005; columbite price was discontinued in 2000; and pyrochlore price was discontinued in 1993. ⁵Defined as imports – exports + adjustments for Government and industry stock changes.

⁶This category includes other than niobium-containing material.

⁷Actual quantity limited to remaining sales authority; additional legislative authority is required.

⁸See Appendix B for definitions.

⁹See Appendix C for definitions.